Template for Submission of Scientific Information
to Describe Areas Meeting Scientific Criteria for
Ecologically or Biologically Significant Marine Areas

Title/Name of the area: Northern part of the White Sea

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Abstract (*in less than 150 words)*

The Northern part of the White Sea EBSA data presented here are based on synthesizing , extending and updating the assessment done by the IUCN/NRDC and AMSA workshop reports (Speer and Laughlin, 2011; Skjoldal et al., 2012). This EBSA is characterizied by medium uniqueness, high level of importance for life history stages of key or iconic species, medium level of importance for endangered or threatened species, medium level of biological productivity, high level of diversity and high vulnerability and nturalness.

Introduction
(To include: feature type(s) presented, geographic description, depth range, oceanography, general information data reported, availability of models)

The IUCN/NRDC Workshop to Identify Areas of Ecological and Biological Significance or Vulnerability in the Arctic Marine Environment (Speer and Laughlin, 2011) identified a super-EBSA named “White Sea/ Barents Sea Coast” as meeting nearly all CBD criteria. “This region is characterized by highly productive coastal waters influenced by a coastal branch of warm current originating from the North-Atlantic current. The area supports diverse and productive benthic communities including kelp, provides important nursery habitat for several species of pelagic fishes, and supports Atlantic salmon as well as seabird colonies with diverse species composition. The area is important for breeding Common eiders, and provides staging, molting and wintering grounds for three eider species including Steller’s eider, which is considered globally vulnerable by IUCN. The White Sea/Barents Sea coast also supports local populations of White Sea beluga whales and provides pupping and molting areas for the entire East Ice harp seal population” (Speers and Laughlin, 2011). The report on identifying Arctic marine areas of heightened ecological significance (AMSA) also revealed the White Sea as an important area (Skjoldal et al., 2012). As the White Sea and the Barents Sea coast is a really big and complex area that includes parts which meet EBSA criteria in different ways we provide here a separate description and recent information for the included areas which correspond to “elementary” EBSA mapped and listed in Annexes 1 and 2 to the IUCN/NRDC Workshop report.

Location
(Indicate the geographic location of the area/feature. This should include a location map. It should state if the area is within or outside national jurisdiction, or straddling both.)

This area cover EBSA 13 identified in the IUCN/NRDC Workshop report (Spper and Laughlin, 2011) and includes the entire northern part of the White Sea located to the north of it, i.e. Gorlo Strait, Mezen’ Bay, and Voronka. The northern boundary goes along the line between Sviatoi Nos and Kanin Nos capes. It os located entirely within Russia’s jurisdiction (internal sea), but contains international sea routes.

Feature description of the proposed area

(This should include information about the characteristics of the feature to be proposed, e.g. in terms of physical description (water column feature, benthic feature, or both), biological communities, role in ecosystem function, and then refer to the data/information that is available to support the proposal and whether models are available in the absence of data. This needs to be supported where possible with maps, models, reference to analysis, or the level of research in the area)

In the northern part of the White Sea the Gorlo (Russian word for "throat") is a relatively narrow (about 40 km wide) and shallow (average depth 37 m) strait connecting the outer part of the White Sea, Voronka (Russian word for "funnel") and the Mezen' Bay with its inner part (Berger & Naumov, 2001). It comprises about 10% of the total area of the White Sea (about 90 thousand km^2) and receives about 20% of the tidal energy entering the White Sea. As a result the tide height in the Gorlo is 3 m while the velocities reach 100-120 cm s^{-1} (Pantyulin 2003). Tidal mixing leads to the unstratified water column, the characteristics over most part of the Gorlo and in the Mezen'Bay (Timonov, 1925; Kosobokova et al., 200_). Tidal velocities and heights are greater along the Terskiy Coast (Kola Peninsula) in the west where the more haline mixed water of Voronka is transported into the inner White Sea [the flow called "Derjugin Current" by Naumov and Fedyakov (1991)] than along the eastern, Zimniy (Russian word for "Winter") Coast where the fresher water fed by the Dvina Current is advected out of the inner White Sea, predominately of the Dvina Bay (Derjugin 1928, Timonov 1950, Naumov and Fedyakov 1991). The latter flow called "Timonov Current" by Naumov and Fedyakov (1991) is characterized by lower salinity: 26-28 ppt in summer and up to 28.5 ppt in winter compared to 28.5-29 ppt in summer and up to 30 ppt in winter in the Derjugin Current area. Temperature in the mixed water column of the Gorlo increases from extreme negative values (-1.57 ºC) in January – March to about 6-7 ºC in July – August, the most rapid increase takes place in June - early July (Anonymous, 1962-1968). A system of mesoscale 3-dimensional circulations caused by the inflow of salty Barents Sea waters with the Derjugin Current, tidal wave propagation and their interaction with the Timonov Current is formed inside the Gorlo (Naumov and Fedyakov 1991; Berger and Naumov, 2001; Krasnov et al., 2012). In the north the waters of the Gorlo and the Bay of Mezen' are separated from the Voronka waters by a salinity front (Naumov and Fedyakov, 1991; Pantyulin 2003; Kostianoy et al., 2004). The very shallow Mezen' Bay characterized by high tidal energy and the highest tidal magnitude (up to 8 m).

Strong tidal currents, which change their direction, form local circulations, create high turbulence and mix the water column generally down to the seabed (Timonov, 1925; Naumov and Fedyakov 1991; Pantyulin 2003; Kosobokova et al. , 2004). This leads to the transport of sand along the bottom in the form of travelling sand bands with ripples, instability of lithodynamic processes and transformation of the sediment structure with the changing current direction. A complex glacial relief complicates the facial structure of the seabed and makes the patchy seascape very dynamic (Nevessky et al., 1977; Rybalko et al., 1989).

The sea_ice regime of the White Sea is very dynamic and variable. Landfast ice builds up in the bays and inlets, however the landfast ice zone is rarely wide, usually less than 1 km. The first stable ice forms in the Mezen' river mouth as early as in October; with the latest freezing period observed in the highly dynamic areas off the Terskiy Coast. The entire sea is usually ice_free again by late May. An important feature of the sea ice regime of the White Sea is the regular export of the ice floes to the Barents Sea (Krasnov et al.,, 2011). The riverine discharge of Severnaya Dvina and the pattern of mesoscale water circulation combine to create so-called spiral eddies; this is a prerequisite for the formation of large and stable ice floes in the Basin and the Gorlo of the White Sea. These ice habitats attract harp seals which arrive in February and March from the Barents Sea and the adjacent North East Atlantic to breed and moult (Melentyev and Chernook, 2009).

Water circulation and winds create a stable system of polynyas along Terskiy Coast. The distribution pattern of wintering birds in the polynyas of the Terskiy Coast depends on sea ice conditions and may considerably change from year to year. In periods of heavy ice most of the sea birds migrate to the north western part of Voronka (the outermost part of the White Sea) and to the Murman Coast (Krasnov et al., 2011).

Feature condition and future outlook of the proposed area
(Description of the current condition of the area – is this static, declining, improving, what are the particular vulnerabilities? Any planned research/programmes/investigations?)

Such characteristics as sea ice regime, lithology are highly dynamic but the main physical features determining conditions in the area are persistent: strong tidal currents and deep winter convections leading to formation of the White Sea deep water. Benthic fauna of the Gorlo Strait does not show significant changes related to the general climate transformation (Solyanko et al., 2011). Economic activity is low except of shipping which contains a potential threat of fuel and hydrocarbon cargo spills – the major vulnerability to particular biological phenomena of the area: molting and wintering of sea ducks and whelping of harp seals (*Pagophilus groenladicus*).

Assessment of the area against CBD EBSA Criteria
(Discuss the area in relation to each of the CBD criteria and relate the best available science. Note that a proposed area for EBSA description may qualify on the basis of one or more of the criteria, and that the polygons of the EBSA need not be defined with exact precision. And modeling may be used to estimate the presence of EBSA attributes. Please note where there are significant information gaps)

CBD EBSA Criteria (Annex I to decision IX/20)	**Description** (Annex I to decision IX/20)	**Ranking of criterion relevance** (please mark one column with an X)			
		No information	**Low**	**Medium**	**High**
Uniqueness or rarity	Area contains either (i) unique ("the only one of its kind"), rare (occurs only in few locations) or endemic species, populations or communities, and/or (ii) unique, rare or distinct, habitats or ecosystems; and/or (iii) unique or unusual geomorphological or oceanographic features.			X	
Explanation for ranking The area houses no unique habitats nor endemic species, but is remarkable owing to its specific role in forming unique oceanographical regime o the White Sea, i.e. formation of cold deep water owing to winter convection. Also it provides an example of a biotic boundary partly preventing dispersal of the outside fauna into the White Sea (Derjugin, 1928; Naumov, 2006; Solyanko et al., 2011).					
Special importance for life-history stages of species	Areas that are required for a population to survive and thrive.				X
Explanation for ranking Tersky coast in the Voronka, southern coast of Mezen' Bay and the Gorlo are the only migration route of Atlantic salmon (*Salmo salar*) into the White Sea, while the rivers Ponoi, Kuloi and Mezen maintain still abundant salmon stocks (Studenov, 1991, 2011). Mezen' Bay and the coastal waters of Kanin Peninsula are one of the main spawning grounds of navaga (*Eleginus navaga*) (Stasenkov, 1991). Coastal zone of Terskiy Coast from the mouth of Strelna River to Sviatoi Nos Cape is the most important molting area for eiders: common eider (*Somateria molissima*) of the Murman coast population, king eider (*Somateria spectabilis*) and Steller eider (*Polysticta stelleri*). For the migratory Atlantic population of king eider this molting area is the largest and most important (Krasnov et al., 2006). In the polynyas of Tersliy Coast, three species of eider spend the winter (Krasnov et al., 2011). Finally, the sea ice floes in the northern part of the deep White Sea Basin and the Gorlo are most important whelping and molting area of the Barents Sea population of harp seals (Melentyev and Chernook, 2009; Svetochev and Svetocheva, 2011).					
Importance for threatened,	Area containing habitat for the survival and recovery of endangered, threatened, declining species or area with significant assemblages of				X

<table>
<tr><td>endangered or declining species and/or habitats</td><td>such species.</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="6">Explanation for ranking
The area has some importance for maintaining populations of endangered shore birds of prey, such as white-tailed sea eagles (Haliaeetus albicilla). It is also currently being increasingly important as an area often visited by migratory Atlantic walruses of the Pechora Sea population. Coastal waters of Terskiy Coast is the principal molting area of Steller eider (Polysticta stelleri) (Krasnov et al., 2006) and its important wintering ground (Krasnov et al., 2011).</td></tr>
<tr><td>Vulnerability, fragility, sensitivity, or slow recovery</td><td>Areas that contain a relatively high proportion of sensitive habitats, biotopes or species that are functionally fragile (highly susceptible to degradation or depletion by human activity or by natural events) or with slow recovery.</td><td></td><td></td><td></td><td>X</td></tr>
<tr><td colspan="6">Explanation for ranking
The ecosystems of northern part of the White Sea are functioning in a severe environment and many processes are strongly physically driven. The scale and impact of human activity can not be compared to force of climatic, oceanographical and lithogenic processes which permanently affect habitats and biotopes of marine species (dynamics of sea ice biotopes, sediment transport etc.). In this way they can be called sensitive but the environmental impact largely remains within the normal variation and functioning of marine communities and ecosystems in the area. However, there are two important aspects of high vulnerability coastal concentrations of sea ducks at molting grounds in the near shore zone of Terskiy Coast in summer, and wintering concentrations in polynyas in the same area . These aggregations and their havitats are extremely vulnerable to oil spills which may bring to significant decline entite regional populations of common, king and Steller eiders (Krasnov et al., 2006, 2011). Secondly, whelping concentrations of harp seals on sea ice in the Gorlo are highly vulnerable to sea ice conditions and their breeding success is affected by changes in climate and sea ice regime and may be worsened by shipping (which destroys suitable ice floes) and oil spills.</td></tr>
<tr><td>Biological productivity</td><td>Area containing species, populations or communities with comparatively higher natural biological productivity.</td><td></td><td></td><td>X</td><td></td></tr>
<tr><td colspan="6">Explanation for ranking
Primary production in the northern part of the White Sea Basin is relatively high. Absence of stratification may contribute to low pelagic productivity with values being among the lowest for the White Sea (Rat’kova and Savinov, 2001). Modeling of yearly averaged primary production based on satellite measurements of chlorophyll concentration confirms low phytoplankton productivity (< 0.04 g C m^{-2} day^{-1}) compared to other areas of the White Sea (Romankevich and Vetrov, 2001). At the same time concentration of suspended organic carbon in the near bottom layer of the Gorlo in summer was found to be relatively high (> 0.3 g m^{-3}) and exceeding respective values in most areas of the White Sea except the areas close to the Severnaya Dvina and the Onega River estuaries (Agatova et al., 1994). The origin of this organic matter is not known with certainty. On the other hand the intertidal zone in the Gorlo, particularly on the Terskiy (western) Coast houses Laminaria kelp with the total community biomass reaching the highest for the White Sea values (Naumov, 2001). Thus part of suspended carbon entering the benthal of the Gorlo may originate from the local kelp ecosystem.
Biomass of macrobenthos is generally not high, normally less than 100 g m^{-2} (Naumov, 2001; Solyanko, 2010) but some communities dominated by bivalves are remarkable and possibly play important role in feeding benthic predators: fishes and sea ducks. In the Gorlo blue mussel (Mytilus edulis) beds are shifted to the depth range of 5-20 m in the southern and the middle parts of the Gorlo and to the uppermost subtidal belt (0-5 m) in its northern part while in the intertidal zone mussels are not very abundant (Milyutin and Sokolov, 2006).
Probably these mussels have sufficient supply of their food, i.e phytoplankton owing to intensive currents facilitating filtration.
Horse Modiolus modiolus along with Balanus crenatus, ascidians, sponges and calcareous algae build up the major part of the sublittoral benthic biomass in the Mezen’ Bay which is in average higher than in the Gorlo, about 200 g m^{-2}. Extensive tidal and upper subtidal flats biotopes (similar to “die Watten” of the continental part of the North Sea) are populated by dense blue mussel beds while infaunal communities there are dominated by Macoma balthica; (Naumov, 2001). Voronka is know for its remarkable scallop (Chlamys islandica) beds.
At the same time conditions for pelagic feeding of sea birds in the Gorlo and offshore areas south of it are much poorer than in the coastal waters of the Barents Sea (biomass-rich zooplankton and pelagic fishes are scarce) and most of colonial sea birds, which are abundant to the west of Sviatoi Nos Cape avoid the White Sea (Krasnov et al., 2012).</td></tr>
<tr><td>Biological diversity</td><td>Area contains comparatively higher diversity of ecosystems, habitats, communities, or species, or has higher genetic diversity.</td><td></td><td></td><td></td><td>X</td></tr>
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Explanation for ranking In spite of harsh condition macrobenthic fauna of the Gorlo is thus generally rich (over 350 species) but mostly consists of rarely occurring species (Solyanko, 2010; Solyanko et al., 2011). the total number of macrobenthic species (167) is clearly less than in the Gorlo (Naumov, 2001).In the Gorlo distribution of different types of benthic communities is highly mosaic, and this mosaics is clearly seen in all spatial and temporal scales (Naumov, 2001; Denisenko etal., 2006; Solyanko, 2010).					
Naturalness	Area with a comparatively higher degree of naturalness as a result of the lack of or low level of human-induced disturbance or degradation.				X
Explanation for ranking The area is practically undisturbed as it has very scarce population on the coast, limited fishing activity, and virtually no industrial activity in the watersheds (Terzhevik et al., 2005) nor tourism. Shipping and oil transportation along the Gorlo Strait has been recently intensified (Bambulyak and Frantzen, 2009) but fortunately not yet significantly affected naturalness of the area.					

Sharing experiences and information applying other criteria (Optional)

Other Criteria	**Description**	**Ranking of criterion relevance** (please mark one column with an X)			
		Don't Know	**Low**	**Medium**	**High**
Add relevant criteria					
Explanation for ranking					

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(e.g. relevant documents and publications, including URL where available; relevant data sets, including where these are located; information pertaining to relevant audio/visual material, video, models, etc.)

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Maps and Figures

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